CLAIMS

I CLAIM AS MY INVENTION:

1. A ceramic composition comprising:

a plurality of oxide shapes;

a filler powder comprising zirconia-hafnia; and

a binder material partially filling gaps between the oxide shapes and the filler powder.

2. The composition of claim 1, wherein the portion of hafnia in the zirconia-hafnia is in the range of 50-95 mol%.

3. The composition of claim 1, wherein the portion of hafnia in the zirconia-hafnia is in the range of 60-75 mol%.

4. The composition of claim 1, wherein the portion of hafnia in the zirconia-hafnia is at least 20 mol% and less than 100 mol%.

5. The composition of claim 1, wherein the filler powder comprises composite particles each comprising zirconia-hafnia and alumina.

6. The composition of claim 5, wherein the portion of alumina in the composite particles is in the range of 20-50 mol%.

7. The composition of claim 1, wherein the filler powder comprises particles having an average size of at least 30 microns.

8. The composition of claim 1, further comprising:

the oxide shapes comprising hollow mullite spheres;

the filler powder comprising composite particles comprising zirconia-hafnia and alumina; and

the binder material comprising alumina.

9. The composition of claim 1 disposed on an oxide-oxide ceramic matrix composite substrate material.

10. The composition of claim 9, wherein the portion of hafnia in the zirconia-hafnia is selected to limit a phase transformation of the zirconia-hafnia from a monoclinic phase to a tetragonal phase to occur throughout no more than 20% of a thickness of the material remote from the substrate material at a predetermined use temperature.

11. An article comprising:
a ceramic substrate; and
an overlayer comprising zirconia-hafnia disposed on the ceramic substrate.

12. The article of claim 11, wherein the ceramic substrate comprises one of the group of alumina, mullite, yttrium aluminum garnet and zirconia.

13. The article of claim 11, wherein the ceramic substrate comprises a non-oxide; and
an oxygen barrier layer interposed between the ceramic substrate and the overlayer.

14. The article of claim 11, wherein the portion of hafnia in the zirconia-hafnia is in the range of 50-95 mol%.

15 The article of claim 11, wherein the portion of hafnia in the zirconia-hafnia is in the range of 60-75 mol%.

16 The article of claim 11, wherein the portion of hafnia in the zirconia-hafnia is at least 20 mol% and less than 100 mol%.

17 The article of claim 11, wherein the overlayer comprises zirconia-hafnia and alumina.

18 The article of claim 11, wherein the portion of alumina in the overlayer is in the range of 20-50 mol%.

19. An article comprising:

a ceramic matrix composite substrate;

an insulating layer comprising mullite disposed on the substrate; and

an overlayer comprising zirconia-hafnia disposed on the insulating layer.

20. The article of claim 19, wherein the overlayer comprises zirconia-hafnia and alumina.